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14. ABSTRACT

This grant led to several accomplishments. One of the more important involved web search. We developed a technique of ranking web pages that was unaffected by changing links on a web page. We proved that you could not increase you rank by creating short cycles nor could you hurt the rank of another web page by more than you had increased the pages rank. We also develop techniques for determining which pages contributed most to a given page's page rank. In the early years of the World Wide Web individuals put links on the pages for navigational purposes. However, as Google and other search engines become very efficient at locating web pages, research ceased putting links on the pages for navigational purposes.

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Accomplishments:

This grant led to several accomplishments. One of the more important involved web search. We developed a technique of ranking web pages that was unaffected by changing links on a web page. We proved that you could not increase you rank by creating short cycles nor could you hurt the rank of another web page by more than you had increased the pages rank. We also develop techniques for determining which pages contributed most to a given page's page rank. In the early years of the World Wide Web individuals put links on the pages for navigational purposes. However, as Google and other search engines become very efficient at locating web pages, research ceased putting links on the pages for navigational purposes. We developed a theory to show what impact this would ultimately have on the web structure.

Other areas we contributed to the development of multi task learning, to techniques for finding communities in graphs and made initial contributions to tracking the flow of ideas in scientific literature. Some initial progress has also been made in determining the connections between people based on when they acquire some item.

Publications:

1. Anirban Dasgupta, John Hopcroft and Ravi Kannan, "Spectral Clustering with Limited Independence,", SODA 2007.
2. Andre Allavena, Anirban Dasgupta, John Hopcroft and Ravi Kumar, "Finding Short Paths in Social Networks", Internet mathematics Vol. 3 No 2, 2006.
3. Reid Andersen, Christian Borgs, Jennifer Chayes, John Hopcroft, Vahab Mirrokni, and Shang-Hua Teng, "Local Computation of PageRank Contributions", WAW 2007.
4. John Hopcroft and Dan Sheldon, "Manipulation-resistant Reputations using Hitting Time", WAW 2007.
5. Reid Andersen, et al, "Robust PageRank and Locally Computable Spam Detection Features", AIRWeb 2008.
6. Reid Andersen, et al, "On the Stability of Web Crawling and Web Search", ISAAC 2008.

7. Daniel Sheldon, “Graphical Multi-Task Learning”, NIPS.

8. John Hopcroft and Daniel Sheldon, “Network Reputation Games”, submitted for publication.

9. John Hopcroft and Sucheta Soundarajan, “Recovering Social Networks from Contagion Information”, submitted for publication.

10. Liaoruo Wang and John Hopcroft, “Community structure in large complex networks”, submitted for publication.